

Claims

What is claimed is:

1. A method of manufacturing a semiconductor device, comprising:

forming a dummy gate layer above a semiconductor substrate;

forming a spacer layer adjacent each side of the dummy gate layer above the semiconductor substrate;

selectively forming a silicon layer by epitaxial growth above the semiconductor substrate;

forming a gate electrode after removing the dummy gate layer;

forming a source/drain region by introducing an impurity into the semiconductor substrate through the silicon layer; and

changing the silicon layer into a silicide layer.

2. A method of manufacturing a semiconductor device, comprising:

forming an insulating layer for isolation on a semiconductor substrate;

forming a dummy gate layer above the semiconductor substrate;

forming a spacer layer adjacent each side of the dummy gate layer above the semiconductor substrate;

selectively forming a silicon layer by epitaxial growth above the semiconductor substrate;

forming a gate electrode after removing the dummy gate layer;

forming an extension region by introducing an impurity into the semiconductor substrate from which the spacer layer is removed by ion implantation after removing the spacer layer;

forming an insulating layer for a side wall adjacent each side of the gate electrode;

forming a source/drain region by introducing an impurity into the semiconductor substrate through the silicon layer by ion implantation; and

changing the silicon layer into silicide.

3. The method of manufacturing a semiconductor device according to claim 2, wherein the spacer layer is formed by anisotropic etching after depositing a material that is different from the dummy gate layer above the semiconductor substrate.

4. The method of manufacturing a semiconductor device according to claim 2, further comprising, after forming the silicon layer, forming a stopper layer

composed of silicon oxide on the surface of the silicon layer by thermal oxidation.

5. A method of manufacturing a semiconductor device, comprising:

forming an insulating layer for isolation on a semiconductor substrate;

forming a groove in a predetermined region after forming an insulating layer above the semiconductor substrate;

forming a dummy gate layer above the semiconductor substrate, the dummy gate layer including a lower portion in the groove and an upper portion which is wider than a width of the groove, the upper portion having a side positioned outside of the groove;

patterning the insulating layer by using the dummy gate layer as a mask, and forming a spacer layer adjacent each side of the dummy gate layer above the semiconductor substrate;

selectively forming a silicon layer by epitaxial growth above the semiconductor substrate;

forming a gate electrode after removing the dummy gate layer;

forming an extension region by introducing an impurity into the semiconductor substrate from which the spacer layer is removed by ion implantation after removing the spacer layer;

forming an insulating layer for a side wall adjacent each side of the gate electrode;

forming a source/drain region by introducing an impurity into the semiconductor substrate through the silicon layer by ion implantation; and
changing the silicon layer into silicide.

6. The method of manufacturing a semiconductor device according to claim 5, further comprising, after forming the silicon layer, forming a stopper layer composed of silicon oxide on the surface of the silicon layer by thermal oxidation.